Non- Invasive Positive Pressure Ventilation (NIPPV)

(THIS GUIDELINE REPLACES NWA REGIONAL PROTOCOL- CPAP)

INDICATIONS:

- Patients with moderate to severe respiratory distress secondary to pulmonary edema (wet lung sounds), COPD, asthma, or submersion incidents.
- Indications of moderate to severe respiratory distress can include:
  - Retractions
  - Accessory muscle use
  - Tachypnea (respiratory Rate > 25/ min)
  - Pulse oximetry reading < 90%
  - Tripod Position
  - 1 to 2 word sentences

CONTRAINDICATIONS:

- Respiratory or cardiac arrest
- Systolic blood pressure < 90mmhg
- Severely depressed level of consciousness
- Inability to maintain airway patency
- Major trauma, especially head injuries with increased ICP or significant chest trauma
- Facial trauma effecting mask seal
- Signs and symptoms of pneumothorax
- Vomiting
- Gastric distention or active GI bleed
- Inability to tolerate mask on face
- 12 lead indication of a right sided or inferior STEMI

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NIPPV Modes

Pulmonary Edema

CPAP

PEEP: Initially **5** cmH_2O and can adjust up to **MAX** of **10** cmH_2O

FiO_2: Titrate (if able) to maintain $SpO_2 \geq$ **94%**

- Hold mask in place as patient adjusts to NIPPV support
- **Adjust mask to minimize air leak/ patient comfort if possible**
- Evaluate if patient is improving:
  - Easier resp. mechanics
  - Normalizing resp. rate
  - Improved $Sp0_2$
  - Improved $ETCO_2$

Is the patient improving on CPAP?

YES → Maintain NIPPV parameters

NO → Increase **PEEP** in increments up to **MAX** of **10** cmH_2O
Titrate **PS** in increments of **1** cmH_2O; max is **5** cmH_2O

COPD, Asthma

Bi- Level

Set **PEEP**: **5** cmH_2O
Set **PS**: **2-3** cmH2O
FiO_2: Titrate (if able) to maintain an acceptable SpO_2 for the specific patient.

- Hold mask in place as patient adjusts to NIPPV support
- **Adjust mask to minimize air leak/ patient comfort if possible**
- Evaluate if patient is improving:
  - Easier resp. mechanics
  - Normalizing resp. rate
  - Improved $Sp0_2$
  - Improved $ETCO_2$

Is the patient improving or tolerating Bi-Level support?

YES → Maintain NIPPV parameters

NO → AND/OR

- Decrease Trigger Level in small increments if the patient is having difficulty actuating a breath.
- Titrate **PS** +/- in increments of **2** cmH_2O; max is **10** cmH_2O.
- Increase **Cycle Off %** in increments of **5%** if the patient is having difficulty exhaling. **MAX 50%** If **'HIGH BREATH RATE'** alarms; lower **%** until alarm stops

Set parameters before applying the mask

AEV®

IPAP= PEEP + PS
Maximum IPAP= 15cmH_2O
EPAP= PEEP

Special Considerations/ Complications:

- Do not set the **PS** and **PEEP** to other ventilator, BI-PAP, CPAP devices. The AEV® **PS** settings are unique to this device.
- Adjust the settings to the patients' needs.
- Bronchodilators can be used inline via nebulizer t- piece in line with NIPPV.
- It is very important to achieve a tight seal between the face and the NIPPV mask to deliver anticipated levels of NIPPV.
- Monitor closely for nausea/ impending emesis- be prepared to quickly remove the facemask to avoid aspiration of emesis.
- **Possibly prepare for intubation if NIPPV is failing to improve respiratory distress/ failure.**

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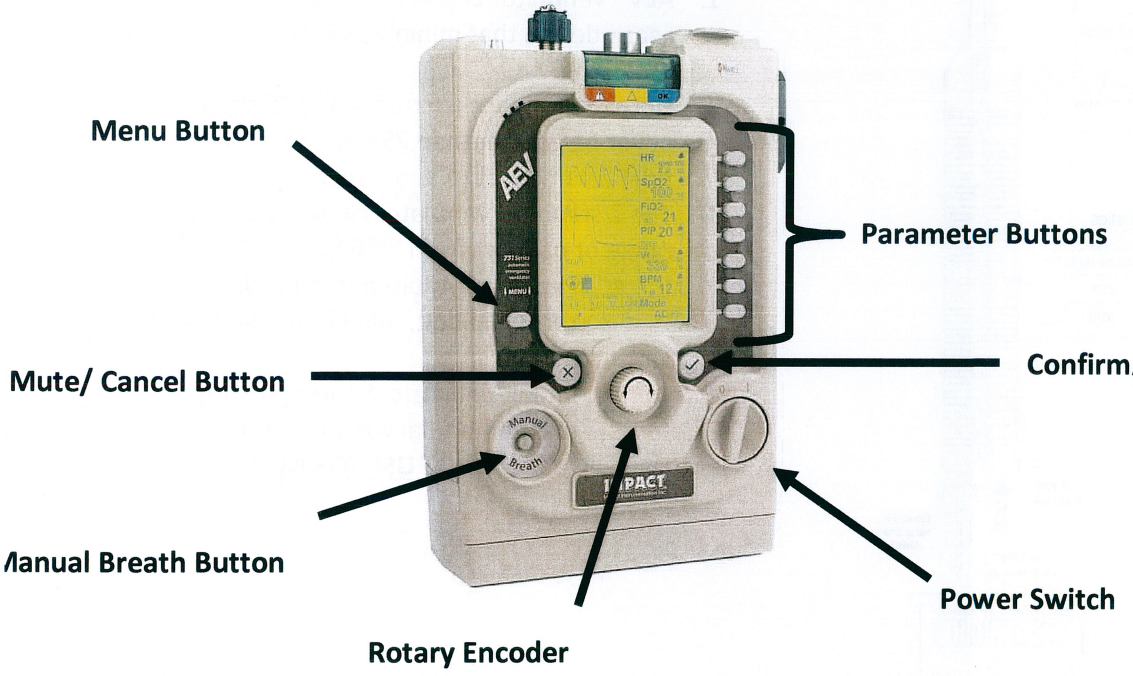

CHECK THE VENTILATOR CIRCUIT FOR PROPER OPERATION BEFORE CONNECTING TO A PATIENT

Procedure:

1. With the breathing circuit connected, turn the **POWER** switch to ON, to allow the ventilator to complete Self Check and begin operation with its default values.
2. The PATIENT DISCONNECT alarm should be active. (The audible alarm will be muted during the 2 minute initial mute.)
3. Press the **MANUAL BREATH** button; gas should flow out of the patient connection each time the button is pressed.

Note: The minimum period between manual breaths is limited by the tidal volume and the time required to complete a full exhalation based on the I:E ratio.)

4. Close the patient port with a clean hand or gloved hand. During inspiratory phase, the HIGH AIRWAY PRESSURE LIMIT alarm should activate after 2 breaths that reach the PIP High Limit.
5. If the HIGH AIRWAY PRESSURE LIMIT alarm fails to activate, ensure that all of the tubing connections are secure, the exhalation valve is closing during inhalation, and that the High Airway Pressure Limit is set to 35 cm H_2O or less.
6. After a breath or two, release the patient port while allowing the ventilator to operate. The PATIENT DISCONNECT alarm should activate.
7. Partially close the patient port to reset the PATIENT DISCONNECT alarm. With no other alarms occurring, remove external power from the ventilator. The EXTERNAL POWER LOW/DISCONNECT alarms should activate. Reconnect external power to reset alarms.
8. If the HIGH AIRWAY PRESSURE, PATIENT DISCONNECT, or EXTERNAL POWER LOW/DISCONNECT alarms fail to activate, continue to manually ventilate the patient, replace the ventilator, and send the unit in for service.

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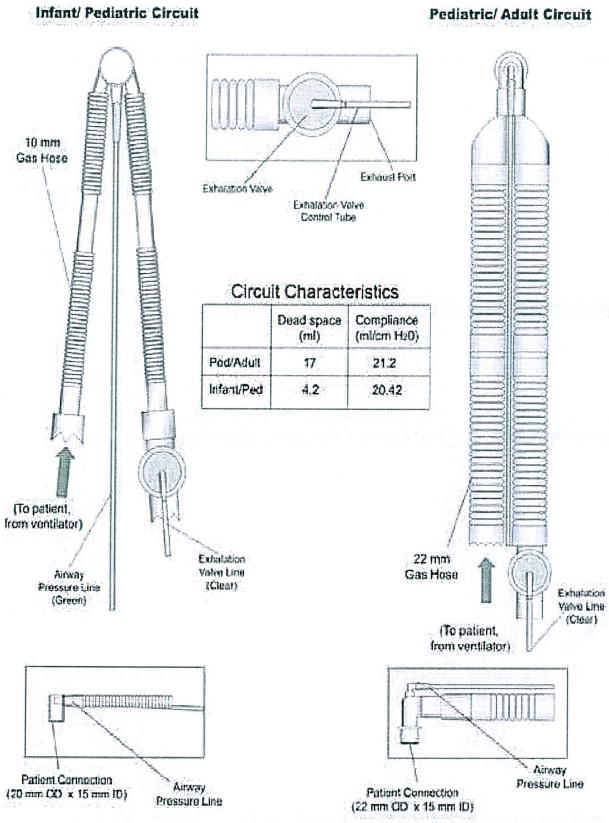
Circuits:

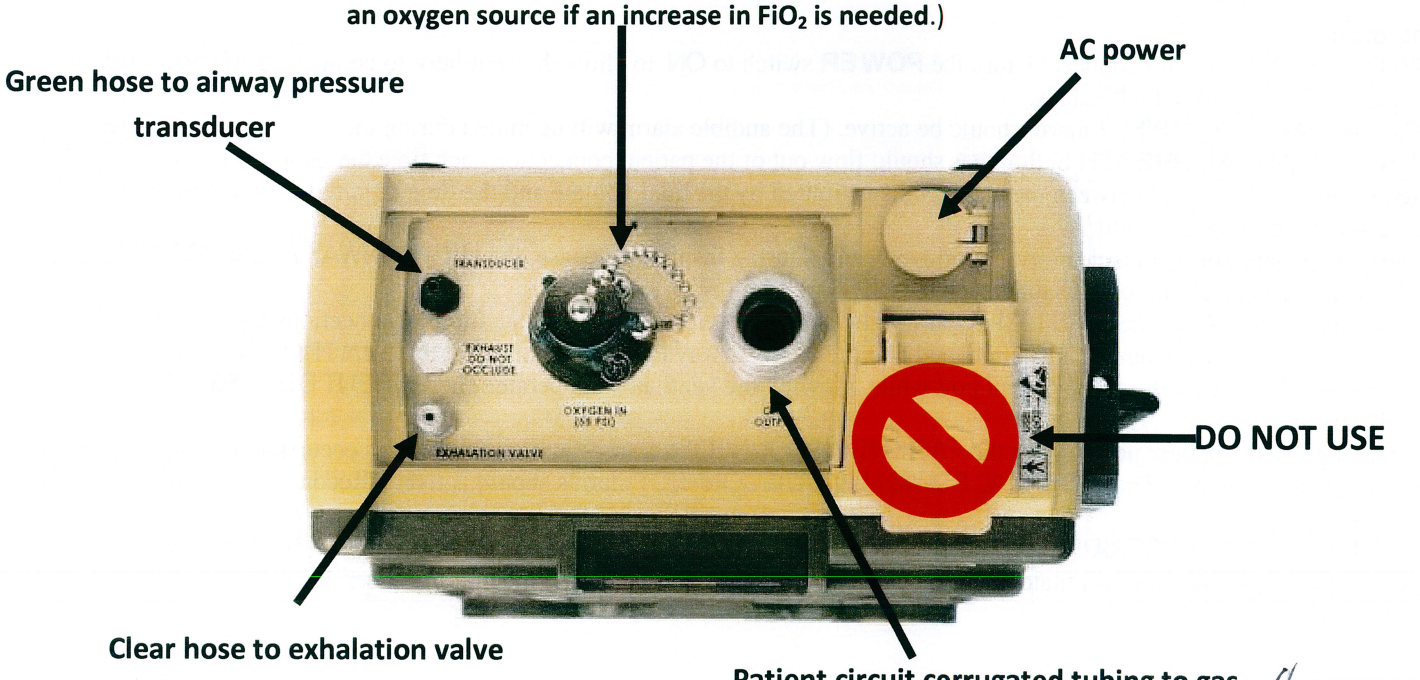


Circuit Characteristics

	Dead space (ml)	Compliance (ml/cm H_2O)
Ped/Adult	17	21.2
Infant/Ped	4.2	20.42

1. AEV® ventilator circuits feature a low dead space design that minimizes CO_2 re-breathing.
2. Note: dead space (circuit and HME should never be greater than **25**% of the patient's tidal volume (set or spontaneous).
3. The 2 standard ventilator circuits cover the range of patients from infant to adult.
   - Pediatric/ Adult- patients 20kg through adult, minimum tidal volume 200ml.
   - Infant/pediatric- 5 through 30 kg, maximum tidal volume 300mL.

****DO NOT USE FOR NIPPV****



NIPPV

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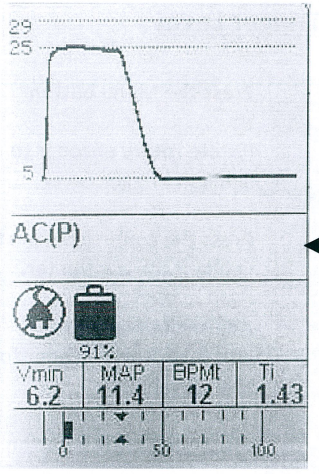
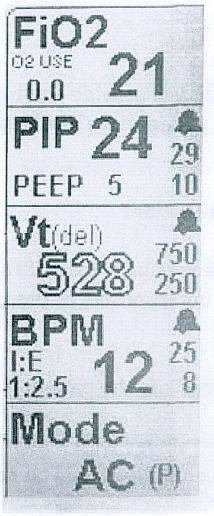


Breath Waveform (PIP Value will be displayed)

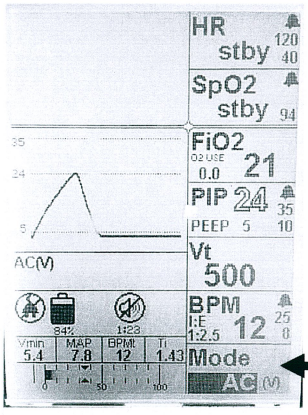
Current Mode

Additional Information
- External Power
- Battery
- Oxygen
- Speaker
- Head with mask
- Airway Pressure/ Measured Values



-ANY NUMBER IN BOLD BLACK IS ADJUSTABLE PARAMETER
-ANY NUMBER OUTLINED IS A PATIENT DEPENDENT VALUE (NON ADJUSTABLE)
-PRESS THE PARAMETER BUTTON NEXT TO THE PARAMETER TO MAKE ADJUSTMENTS.
-PRESS THE PARAMETER BUTTON MUTIPLE TIMES TO SCROLL THROUGH THE ADDITIONAL ADJUSTABLE PARAMATERS.
-ROTATE THE ROTARY ENCODER TO CHANGE THE HIGHLIGHTED VALUE.
-PRESS THE CONFIRM BUTTON TO VERIFY THE CHANGE.
** A PARAMETER STAYS HIGHLIGHTED FOR 5 SECONDS; AFTER THIS TIME; THE UNIT AUTOMATICALLY CANCELS THE OPERATIONS AND RETURNS TO THE DEFAULT SCREEN. **

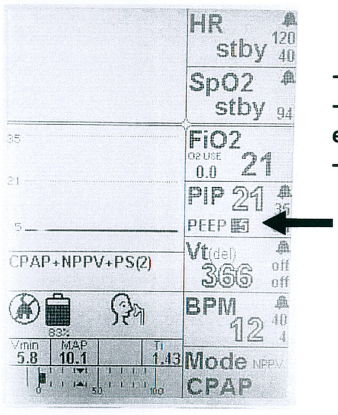
Changing the Primary Parameter



-Change the Mode by pressing the Mode parameter button and turning rotary encoder.

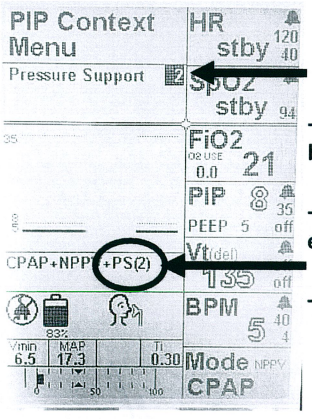
-Choose CPAP and press the Confirm button.

CPAP with NIPPV



SET PEEP:
-Press the PIP parameter button.
-Adjust EPAP level with the rotary encoder to desired value.
-Press the Confirm button.

Adding Pressure (PS) Support

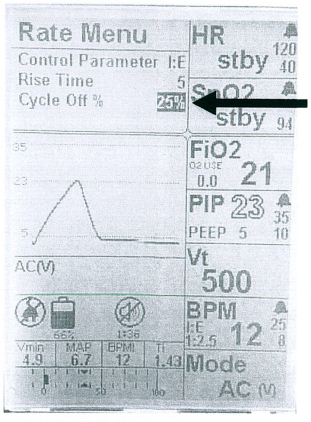


SET PRESSURE SUPPORT (PS):
-Press and hold the PIP parameter button for 3 seconds.

-Adjust IPAP level with the rotary encoder to desired value.

-Press the Confirm button.

Adjusting Cycle Off %



-Press and hold the BPM parameter button for 3 seconds.

-Rotate rotary encoder to highlight Cycle Off %.

-Press the confirm button to highlight the parameter.

-Adjust Cycle Off % with the rotary encoder to desired value.

-Press the Confirm Button

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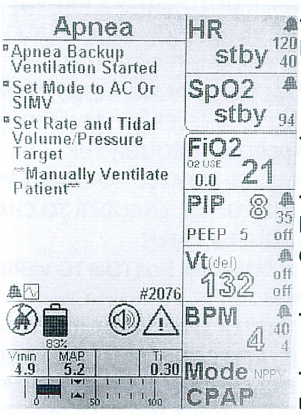
Apnea Alarm



-The ventilator will provide a automatic breath if the patient dose not breathe for 10 seconds.

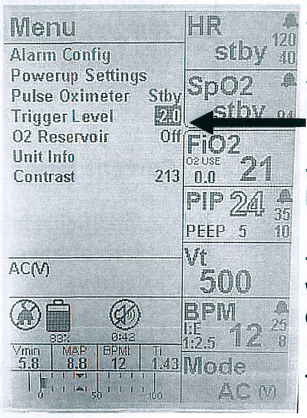
- Reassess the patient

- Remove the ventilator mask if the patient has become unresponsive or the LOC has diminished.

- Manually ventilate the patient if needed.

- An advanced airway with manual/ mechanical ventilations may be needed.

Changing Trigger Level



-Press the Menu button.

-Rotate rotary encoder to highlight Trigger Level

-Press the confirm button to highlight the parameter.

-Adjust the Trigger Level with the rotary encoder to desired value.

-Press the Confirm button.

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